linear georeferencing functions is available, but that it is not, in general, completely consistent. The system uses the extra information contained in the additional georeferencing points to provide validation checks to protect against the possibility that some of the data points may be inaccurate **(step 430)**. Points that deviate excessively with respect to a calculated standard error are presumed to be inaccurate and are omitted from the calculation of the georeferencing functions. Note that as new points are added, the system also rechecks points previously marked as inconsistent, to determine if those points should now be considered when recomputing the georeferencing functions.

A1 cont.

Please amend the paragraph extending from page 21, line 20 to page 22, line 4, of the specification to read as follows:

A2

These systems can be easily solved by well-known methods, such as Gaussian Elimination, or LU factorization. The solutions yield the desired values of $\hat{\beta}_1$, $\hat{\beta}_2$, $\hat{\beta}_3$, and $\hat{\beta}_4$, which in turn yield the desired values for $\hat{a}_{11}$, $\hat{a}_{12}$, $\hat{a}_{21}$, $\hat{a}_{22}$, $\hat{b}_1$, and $\hat{b}_2$.

Please amend the first full paragraph on page 23 of the specification to read as follows:

A3

Automatic Error Detection and Handling

When individual points are being assigned x, y, Lon, and Lat values, there is always a potential for error. To reduce the risk of incorrect georeferencing resulting from such errors, certain error handling

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procedures are built into the georeferencing process. The fundamental concept is that of detecting a "bad" point and then removing it from the set of active points, A. Note that removing a bad point from A will not delete the information associated with that point, but it will cause the georeferencing parameters to be completely uninfluenced by that point. We do not wish to remove the point entirely, since it may be determined at a later stage of the georeferencing that the point was not really bad at all, and should be used in the georeferencing calculation. This will be clarified shortly.

A3 cont.

Please amend the paragraph extending from page 23, line 21 to page 24, line 9, of the specification to read as follows:

Detecting Bad Points The following steps outline the bad point detection process using the general linear transform approach to georeferencing.

A4

1. Begin by placing all existing points into the active set, A.

2. If there are fewer than five active points then you are done. Otherwise, for each of the currently active points in turn, move it (call it point k for the sake of convenience) temporarily out of the active set, and then calculate the resulting inverse georeferencing function (call it $\hat{g}^{(k)}$) and its corresponding SSE_k. Also, calculate the difference between the predicted value and the actual value $\delta_k = \left|\hat{g}^{(k)}(Lon_k, Lat_k) - (x_k, y_k)\right|$. Make

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A4 cont

a note of the values , δ_k and δ_k / SSE_k . Return point k to the active set (and move on to the next value of k).

Please amend the first full paragraph on page 24 of the specification to read as follows:

A5

3. From among the results found in step 2 above, find the point, k with the largest value of δ_k / SSE_k which also satisfies $\delta_k / SSE_k > c_1$ and $\delta_k > c_2$ where c_1 , and c_2 are some constants which are set according to the general level of accuracy to be expected on the particular type of map which is being georeferenced, the current number of active points, and the dots per inch of the scanned image. If there is such a point then mark it as bad (by removing it from the active set) and return to step 2 above. Otherwise you are done.

Please amend the paragraph extending from page 24, line 22 to page 25, line 11, of the specification to read as follows:

A6

There are several things to note about this procedure. One is that allowing the values of c_1 and c_2 to change with the number of active points, makes it possible for the georeferencing system and method to utilize points which it might originally determine bad or inconsistent after a large enough sample of points has been gathered to make it clear that a lesser level of accuracy is all that can be achieved on this map. Another observation is that by using this procedure it is impossible to reduce the

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